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King Edward's Hospital Fund for London

MEMORANDUM

ON

HOSPITAL DIET

For consideration by hospitals

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HOSPITAL DIET

In recent years considerable advances have been made in the science of nutrition. A letter by a distinguished scientist recently published in the *Lancet* referred to the urgent necessity of educating the general public on the subject. The writer stated that while nutritional research in Great Britain is second to none, the United States are probably twenty years ahead of this country in the general knowledge and practice of sound feeding. Our hospitals have led the way in medical research, and it would appear now that they have an important part to play in educating the public towards a better standard of feeding. They can only do this successfully if their own catering arrangements keep abreast of nutritional knowledge.

The Fund's Visitors found in the summer of 1942 that a number of hospitals were conscious of the need to review the dietary provided for patients and staff in the light of advances made in recent years in the science of nutrition. Many had taken steps to reform their dietary, some by the appointment of dietitians, some by revision of the menus and the meals provided, especially in regard to breakfasts and suppers. It was evident, however, that no agreed standard existed, and the King's Fund felt that there was room for an attempt to formulate recommendations which would make available to all the experiences of the most advanced. The Distribution Committee of the Fund therefore appointed a Sub-committee to consider the subject, under the Chairmanship of Sir Charlton Briscoe, Bt., F.R.C.P. The Sub-committee have had the advantage of the help of Captain Brierley of the London Hospital; of Miss Broatch, Food Supervisor, London County Council Meals Service; and of Mr. Clayton Fryers, House Governor of the General Infirmary at Leeds. They have also received most important assistance from Professor Drummond, Scientific Adviser to the Ministry of Food, whose wide experience of the application of modern principles of nutrition within the last few years has served to underline the importance and urgency of the problem. Professor Drummond undertook to arrange for a preliminary survey* by Dr. Pyke, of the Ministry of Food, of diet provided for the patients and nursing staff at three general hospitals which had expressed their willingness to co-operate.

* This survey has been received since the preparation of the memorandum and is included as Appendix A.

SECTION I

Standards of Feeding

The Committee have been struck by the wide variation in practice in regard to :—

(*a*) The quality and quantity of food provided.

(*b*) Methods adopted for preparing and serving the food.

(*c*) The application to the diet of nutritional principles.

(*a*) It was formerly the practice to provide only one full meal a day, the remaining meals (notably breakfast and supper) consisting principally of bread, margarine, tea and soup, supplemented by such provisions as the patients' relatives brought in. Before the war it was still usual for patients in some hospitals to provide their own eggs, fruit, sugar, butter, jam, etc. It followed that a patient not so assisted might actually lack sufficient food ; short of this, many patients found it too great a change from their ordinary regime to have no " square meal " between noon one day and noon the next. It is easy to see how the practice of bringing in small " extras " for the patients' enjoyment arose, but not so easy to justify the practice of leaving the patients to provide staple articles of diet which are easily procured in normal times. Moreover, those with experience of hospital catering in war-time state that unless cooked breakfasts and suppers are provided, it is difficult to arrange for the patients to receive their full quantity of rationed foods. The Committee have been glad to note that it is more and more the practice to provide all necessary food, and also cooked breakfasts and suppers, notwithstanding the staffing difficulties of the present time.

This leads naturally to a review of the hour at which breakfast should be served. Formerly it was the practice not to give early tea, but to serve a light breakfast of tea, bread and margarine, and an egg if the patient's friends were able to provide one, at about 6 a.m. Now that the hospital breakfast approximates more nearly to that which the patient receives in ordinary life, it is recommended that a cup of tea be given on waking, and that breakfast be served at a more normal hour, such as 8 a.m. It is much easier to arrange for staff to be on duty to prepare breakfast at this time, and the serving of the meal can be supervised by the ward sister or a senior nurse. Further, it avoids the disadvantage of serving breakfasts before the patients have received nursing care or are likely to have any appetite for an adequate meal.

There is scope also for the provision of some degree of choice for the patient without undue increase of cost to the hospital. However restricted the choice must be, there should always be readily available some suitable alternative for the patient who may have a strong dislike for certain dishes.

(*b*) However well-planned the meals are, and however good the food bought, the diet cannot be regarded as satisfactory unless there are also adequate arrangements with regard to equipment, cooking, carving and serving. Surveys have shown that even where sufficient food is provided, it may be so unpalatable by the time it reaches the patient that much may be wasted and the amount taken may be insufficient. Food cooked in bulk need not be uninteresting if the right methods are employed, and if there is suitable equipment for serving it hot and in an appetising way. The supreme importance of the careful cooking and serving of vegetables, in particular, has been amply demonstrated during the war years, and nutrition experts say that this matter is not as yet receiving sufficient attention in hospitals. The Committee have considered the arrangements in force at hospitals of various sizes for the planning of the dietary, and the buying, cooking and serving of the meals. Section II of this Memorandum contains some observations on the subject.

(*c*) Hospitals have led the way in the dietetic treatment of certain diseases, e.g., diabetes, anaemia, nephritis, peptic ulcer, and there is already evidence of the influence of food factors on other conditions, such as the acute infections, debilitating diseases, fractures and convalescence. The fact is now established that diet is an important factor in the restoration of function and the acceleration of the processes of healing, and so there must be fuller recognition of the value of rightly-chosen and well-prepared food as a basic factor in the treatment of every patient: the healthy man with a fractured femur as well as the diabetic. *The food service should be regarded as one of the essential remedial services offered by the hospitals.*

The comment has been made to the Committee that while hospitals in general recognise the importance of modern principles of nutrition to the extent of appointing dietetic experts on their staff for a comparatively small number of special diets, they are slow to apply these principles to the general ward diets which in some cases remain many years behind the times. Surveys have demonstrated that the general dietary in hospitals may be lacking

in essential factors even when it is adequate in quantity or caloric value. This is a question affecting the welfare of the patients and the prestige of the hospitals, and the Committee felt it right to consider what means could be suggested for effecting improvements, some of which might be put into practice now, notwithstanding war-time difficulties.

Their first conclusion is that since the food service should rank as one of the most important remedial services offered by the hospitals, it is essential to secure the constant interest and the active co-operation of the medical profession. Once the importance of food as a basic factor in the treatment of all patients is recognised, hospitals will become centres, not only for research into the subject, but also for the education of the medical profession. Moreover, the patient should leave hospital enlightened as to the most beneficial and suitable diet for his needs and his circumstances.

Further considerations on the application of nutritional principles, and on the functions of the dietitian, are given in Section III.

SECTION II

The Organisation of the Catering Department

(Note.—*There is some difficulty in finding one term to cover all the processes involved in planning, buying, preparing and serving the diet which finally reaches the patient. In this memorandum the term "catering" has been adopted for the purpose.*)

Catering may be regarded as a single important function or department of the hospital, requiring an experienced catering officer in charge, with a suitable staff.

The planning of the dietary to meet the nutritional standards prescribed by the medical staff should normally be the work of a qualified dietitian.* It follows that the officer in charge of the catering department should either be a dietitian with adequate experience in large-scale catering, or else should act in full consultation with a dietitian.

The staff of the catering department cannot operate effectively unless their respective responsibilities are defined and correlated. Responsibility is too often shared between the various branches of the hospital organisation : e.g., the Secretary may be responsible for the standard of feeding, the Steward for purchasing, and the Matron for (i) the kitchen staff including the appointment and dismissal of the cooks, and (ii) the service of the food in the wards. It is apparent that where the responsibility is thus diffused, the appointment of a dietitian in an advisory capacity may add another element of confusion. The Steward may regard economy as the measure of his efficiency ; for the Matron difficulties of staffing may tend to be predominant ; while a dietitian may concentrate rather on food values than on practical considerations.

It is considered, therefore, that a permanent Committee for the Catering and Dietetic Department (or Food Service Committee), representative of the various administrative and professional interests, should be set up in every hospital. Such a Committee would have an important function in co-ordinating the various interests, such as the financial responsibilities of the catering officer or purchaser, and the choice of foodstuffs advised by the dietitian. The financial responsibility resting with the

* Dietitians have been defined as those who have made a study of the science of nutrition and who have taken the necessary course of training to qualify them for membership of the British Dietetic Association (now 3½ years).

Committee would be clearly defined, and it would include within its purview such matters as wages for chefs and other kitchen staff: in fact, everything coming under the heading of " Catering and Dietetics." The Committee would meet regularly (say, once a month) and would report both to the House Committee and to the Medical Committee. It is suggested that its membership might include :—

Representatives of the House Committee (one of whom would be Chairman)

Representatives of the Medical Staff

The House Governor or Secretary

The Matron

The Dietitian

The Catering Officer (as Secretary).

Smaller hospitals might have to make arrangements according to their establishment, and need not necessarily limit the Committee to persons already connected with the hospital.

In many of the larger hospitals there are scientists attached to the staff who are interested in nutrition. It would clearly be an asset to the Committee to have their help.

The functions of the Catering and Dietetic Department include :—

(*a*) The planning of the dietary.

(*b*) The buying of the food.

(*c*) The preparation and cooking.

(*d*) The serving of the meals.

(*a*) *The planning of the dietary*, it has been suggested, is the work of a dietitian, as an expert on nutritional principles.* The dietary, however, will be unsatisfactory, no matter how good the planning may be, unless there are also adequate arrangements with regard to the buying, preparation, cooking and serving, and suitable equipment for the various processes involved.

(*b*) *The buying* of both perishable and non-perishable commodities is obviously work for an expert, who has had several years' experience in large-scale catering. In general, hospital secretaries and stewards have had no specific training to qualify them for this work, nor should it be regarded as the responsibility of housekeeping sisters or matrons of small hospitals.

* Further observations on this subject are given in Section III.

The grouping of small hospitals for central buying purposes would give them the benefit of expert service and organised transport. It would effect great economies, both in the rates obtainable for large orders and also in eliminating the present system of commission.

(*c*) *Cooking*.—Even where good food is bought, the dietary may be poor as a result of bad cooking. This may occur where the cooks are inefficient or inadequately trained, and when the hospital is short-staffed or not provided with suitable equipment.

The present difficulties in obtaining kitchen staff are fully recognised. In general, however, hospitals would be well-advised to attract first-class cooks by offering more adequate salaries. At one large hospital £20,000 a year was formerly spent on food, but only £1,000 on the salaries and wages of the kitchen staff. A more experienced staff was engaged and, although the expenditure on salaries and wages was raised to £2,000, the total costs were cut by £6,000, with a general improvement in the diet, owing to expert planning, buying, checking, costing and cooking. Economising on wages of kitchen staff is to be deprecated. It may result in bad cooking, and also in a monotonous diet, as the easiest methods of preparing the food have to be used. It may also lead to the practice of giving the patients only one full meal a day, or of giving them dishes which have been prepared and cooked some hours previously, as there are not cooks on duty at all hours of the day. The question of destroying food values by wrong methods of cooking is dealt with in Section III.

Equipment is an important factor. Modern appliances are needed for storing and preparing the food (refrigerators, mixers, slicers, etc.), for cooking it, and for conveying it hot to patients in any part of the hospital.

(*d*) *Serving* (which includes carving) is also a factor of first importance in catering. Even if the hospital buys and cooks well, there may be so much wastage owing to bad or inefficient service that the patient does not receive an adequate diet.

Meat presents a special problem when it has to be carved and served for large numbers. Various methods are in practice :—

(i) The meat may be carved some time previously in a slicing machine and warmed up in gravy. This ensures suitable slices, but they are apt to be tough and unappetising.

(ii) The meat may be carved during the morning by the general kitchen staff, including porters, and sent to the wards in hot dishes. In this case the joint may be hacked and the slices thick: here again they are apt to be tough by the time they reach the patients.

(iii) A joint may be sent to each ward to be carved by the sister. Sisters should know the tastes and requirements of their individual patients, but this method is wasteful, as many pieces are left over.

(iv) The matron or assistant matron sometimes undertakes all the carving: this method is practicable only in very small hospitals.

The best method appears to be for all carving to be done in the kitchen, either by hand or by machine, by people with experience. The meat should then be sent immediately to the wards and served as soon as possible under the supervision of the ward sister.

The ward sister should regard the serving of meals as a most important part of her responsibility, and nurses should be trained to serve trays so that each patient receives a suitable and appetising meal. Any delay in distribution causes loss of heat and renders the meal unpalatable. The supply of trays, cutlery, china, etc., for all patients should be fully maintained. In many hospitals, trays are not in use for the service of ward patients: reduction of expenditure in this direction is to be deprecated.

Note on Finance.—It may be thought that some of the observations contained in this memorandum have been made without consideration of their financial implications and of the difficulties of the hospitals in this respect.

In answer to this, it is suggested that in the past financial considerations have pressed far more hardly and unfairly on the catering department than on other services of the hospital such as, for instance, the dispensary. The use of a new drug is not governed entirely, or even mainly, by its cost. If food is a remedial service, the same principle must apply. In a recent issue of *The Canadian Hospital*, the director of dietetics at Vancouver General Hospital pointed out that the dietitian now has the direction of approximately one-fourth of the total hospital expenditure, plus a growing educational responsibility. The comment is made: "The dietary departments of hospitals have moved swiftly upward from a mere 'food service' status to high

rank for their therapeutic possibilities." In consequence, the standard of feeding in Canadian and American hospitals is higher than in ours.

Further, improvements in the catering processes may often be effected without corresponding increase in expenditure, and may even lead to economies. Expert buying is a noteworthy example of this. Instances could be given of small hospitals obtaining some of their foodstuffs from expensive retail shops, because the Matron, who undertakes the buying, cannot spare time from her other duties for more selective purchasing. Central or group buying, as suggested, or buying by an expert, would allow of a better standard of feeding on a reduced expenditure. Expenditure on cooking equipment, again, or on hot trolleys, may be more than repaid by the reduction of wastage. An experienced dietitian can often suggest means of securing greater variety and nutritional value in the meals without any consequent increase in costs. The question of salaries has already been touched upon, and an instance has been given of the economy effected by employing experienced staff for buying, checking and keeping stores, cooking, carving, etc. For purposes of comparison with salary rates in hospitals the following notes on current rates may be of interest. Expert caterers for large canteens, etc., can now command £500-£600 a year. Larger posts, involving the supervision of groups of ten to twelve canteens, may carry salaries of £800-£1,000 a year. It is not possible to say to what extent these rates are permanent, or are artificially inflated by the present demand for experts in this field. It is obvious, however, that they represent a general standard far in advance of that which has been considered necessary in most hospitals.

Dietitians also are working in canteens and are receiving £450-£500 a year for work similar to that required in hospitals (*i.e.*, advising on the foodstuffs to be used and on the methods of cooking, and supervising the serving). After the war many dietitians and caterers with the necessary experience in large-scale catering should be available for hospital posts, if the hospitals are prepared to revise their standard of expenditure on this most important work.

SECTION III

Some Considerations on Dietetic Principles and the Functions of a Dietitian

The value of a dietary depends not only on its quantity, its caloric value and the due proportion of proteins, carbo-hydrates and fats: it must also contain sufficient vitamins and minerals. This is especially important when considering the diet for hospital patients.

Many patients admitted to hospital are suffering from a chronic state of malnutrition due to unsatisfactory feeding in their homes, which results in diminished powers of resistance and a retarded convalescence. Their sojourn in hospital should be regarded as a time for adjusting deficiencies in the diet and meals should be planned on a sound dietetic basis, care being taken to see that not only are the essential food factors there, but that nothing is lost by careless cooking and serving. In the past, it has not been the custom to include salads or fresh fruit in the hospital menus and thus many valuable foodstuffs have been omitted. The dietitian should be able to represent that some foods are sufficiently important to be purchased even if they are expensive.

It should be the duty of the dietitian to advise on the planning of all diets in hospital, both for patients and for staff, and this should include not only the quantity but the quality and method of preparation and service. It may be an advantage to appoint her as food supervisor. (See Appendix B.)

The dietitian may, when necessary, take a group of patients and calculate their actual requirements, and in cases of malnutrition increase the vitamin and mineral content to meet the deficiencies. In some cases she may, by visiting the patients, discuss their individual difficulties and so adjust the diet to meet the circumstances of the home and to give advice to the patients when the time comes for them to leave hospital.

To supply a uniform amount of each factor every day would mean a monotonous diet. It is considered better, therefore, to plan the menus over two or three weeks, in such a way that the total intake will be sufficient. For instance, knowing that liver is a valuable source of vitamin A, the dietitian would advise that it should be included at such intervals as would make up the amount

to give the required daily average. Neither the cooks nor the patients need be concerned with the specific requirements of each food factor—the dietitian advises the cook or caterer on the choice of foodstuffs which would make up the necessary amount.

The dietitian should also supervise or advise on the methods of cooking employed and thus ensure that a well-planned meal is not ruined in the kitchen. She should also visit the wards during meal-times to see that the service is properly carried out. With these duties, therefore, it is essential that the dietitian be tactful and, by her tact, establish happy relations with the catering officer, the cooks, the ward sisters and the patients.

The aim should be to maintain a satisfactory vitamin intake by properly controlled food, with resort to medicaments to make up deficiencies only in exceptional cases. This should mean better health for everybody, with better nutritional and psychological reactions. To give an instance, many hospital patients require a diet with high content of vitamin C, which is essential for healing. The daily requirement for a healthy adult is estimated by many experts to be as high as 75 mg., but an intake of 50 mg. is not unsatisfactory. A well-chosen and properly-cooked meal may give as much as 50-90 mg. On the other hand, wrong methods of cooking or poor planning may result in a meal which, while equal in bulk, gives as little as 5-6 mg. of vitamin C. The deficiency may be made up by prescribing ascorbic acid ; but by planning and cooking the meals carefully, the necessary amount may be secured without medication. Watercress, for instance, like certain other natural foods, is a valuable source of vitamin C, as well as of vitamin A, calcium and iron.

The Ministry of Food has arranged for many surveys of canteen meals during the war. Such surveys show not only whether the foodstuffs are in the right proportion but whether the meal as finally served has its due vitamin content or has lost it in cooking. Surveys of meals at three hospitals have now been undertaken (see Appendix A).

The results of these surveys do not justify general statements regarding the adequacy or inadequacy of hospital diets. An investigation of a much more extensive character would be necessary to obtain a fair picture of conditions as a whole. On the other hand, the hospitals at which facilities for this enquiry were granted could be regarded as representative of many in the country.

The position revealed by these three surveys is disturbing and confirms the suspicion that the diets, both of hospital patients and of staff, may sometimes be seriously defective by modern nutritional standards.

The question then arises what action is to be taken on the results. Only about 12 per cent. of the hospitals in the Fund's area have dietitians on their staff, and even among the 12 per cent. the dietitian is seldom consulted about the general standard of feeding : as a rule she is responsible for the special diets only. It is thought that more hospitals should employ dietitians, preferably those with considerable experience in large-scale catering, so that they would be competent to advise on the hospital dietary in general. At the same time, it is recognised that there are not at present sufficient dietitians with the requisite qualifications and experience, and also that many of the smaller hospitals would not feel justified in increasing their catering staff by the appointment of a full-time dietitian.

Two suggestions have been made to meet this problem.

One is that small hospitals desiring to have the expert advice and supervision of a dietitian should group themselves into units of sufficient size to warrant such an appointment, and should share the services of a dietitian and the contingent expenses.

The second suggestion is that so far as the voluntary hospitals in the London area are concerned, the King's Fund should offer dietetic advice to hospitals which express a wish for it. When the Fund's Visitors made preliminary enquiries on this subject last year, a number of hospitals said that they would welcome the services of an adviser on diets. On receiving an invitation from such a hospital, the Fund's dietetic adviser might arrange to spend two or three weeks there, first surveying the dietary and the methods of cooking and serving. She might then make suggestions relating either to the planning, cooking and serving of the meals, or to the kitchen staff, or equipment, as found necessary and expedient. She might draw up menus giving an adequate diet over a period, or suggest the choice of foodstuffs most suitable and practicable for each season of the year. She might return at stated intervals to deal with any new problems which had arisen, or to make any readjustments in the menus which circumstances might require.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

SECTION I

1. It is desirable that every hospital should provide cooked breakfasts and suppers, and a dietary which does not need to be supplemented by " extras " brought in by the patients' relatives.

2. The hour of serving breakfast should approximate more nearly to that to which the patients are accustomed in their ordinary life.

3. It is not enough to buy foodstuffs in adequate quantity : quality must be considered, and methods of cooking and serving are of first importance. This is particularly true in the case of vegetables, and this matter is not as yet receiving sufficient attention in hospitals.

4. The therapeutic value of a rightly-planned dietary is now established for all patients, not only for those who are now put on " special diets." It follows that :—

(*a*) The food service should be recognised as an important remedial service offered by hospitals to all their patients.

(*b*) It is essential to secure the constant interest and the active co-operation of the medical profession in this remedial service.

(*c*) Hospitals have an opportunity to educate the public in sound principles of feeding as well as to treat patients by the application of dietetic principles.

SECTION II

Catering, including all the processes involved in planning, buying, preparing and serving the diet which finally reaches the patient, should be regarded as a main department of the hospital.

The planning of the dietary to meet the nutritional standards prescribed by the medical staff should normally be the work of a qualified dietitian. The officer in charge of the catering department, therefore, should either be a dietitian with adequate experience in large-scale catering or else should act in full consultation with a dietitian.

In order to ensure the effective working of the catering department, it is recommended that a permanent Catering or Food Service Committee be set up in each hospital. This Committee should be fully representative of the medical, administrative and executive staff, and it would serve to co-ordinate the various

interests and responsibilities, and to advise the Board on the financial aspect of the food service.

Recommendations follow on the various processes included in the catering department :—

Buying.—The buying of foodstuffs calls for considerable experience. Hospitals which are not large enough to have an expert on their staff for the purpose would benefit greatly by participation in co-operative buying schemes (see Appendix C). Hospitals should take steps to explore the possibilities of making arrangements on these lines wherever practicable.

Cooking.—In view of the profound effect of cooking on the food value and the palatability of the meals, hospitals would be well-advised to budget sufficiently high on wages to ensure an adequate staff of efficient cooks. By this means much better value for money is obtained.

Equipment.—Equipment is an important factor in the storing, preparing, cooking and serving of food, and modern appliances should be installed as far as is practicable.

Serving.—Serving affects the value of the diet and much wastage is caused by indifferent service.

All food should be sent to the wards as soon as possible after cooking, and served under the supervision of the ward sister. When once the meals are delivered at the wards, nothing should be allowed to stand in the way of immediate distribution. The supply of trays, cutlery, china, etc., for all patients should be fully maintained.

Finance.—Hospitals would be well-advised to review their standards of expenditure on the catering department, bearing in mind that in the past financial considerations have pressed more hardly on this important service than on other services of the hospital.

At the same time improvements in the catering processes, and in particular the appointment of more efficient staff, may secure many economies as well as a much better standard of feeding.

Section III

In view of the fundamental importance of a diet planned and prepared on sound nutritional principles, it is recommended that hospitals should place dietitians in charge of the general dietary, not the special diets only.

APPENDIX A

NUTRITION IN THREE HOSPITALS OF MODERATE SIZE

The investigation reported here was carried out at the request of King Edward's Hospital Fund for London. As part of a comprehensive study of hospital feeding it was planned to show as precisely as possible the nutritive value of representative diets provided both for patients and for the nursing staff in typical hospitals. The technique of the investigation was as follows :

Three general hospitals of moderate size were selected by King Edward's Hospital Fund in widely separated parts of the Greater London area. The diet provided for (*a*) male patients, (*b*) female patients and (*c*) the nurses throughout a full week was collected and analysed. The investigator visited the hospital each day before the mid-day meal and arranged for the collection of that meal. All the remaining food of the day, comprising tea, supper, morning tea, breakfast and mid-morning drink, was collected in the same vessel by a member of the hospital staff who was specially chosen to help with the work throughout the week of study. The diet selected for analysis was removed in the ward after it had been served and when it would otherwise have been handed to a patient. The servings were as representative as it was possible to make them of the amounts given to convalescent post-operative patients or patients under investigation. In the case of the nurses' food a similar procedure was adopted. The sample meals, lunch, tea, supper, breakfast and mid-morning snack, were removed in the dining-room at the moment when otherwise they would have been eaten by an individual nurse. Some effort was made to ensure that the member of the hospital staff who helped with the survey should have no direct interest in the quality of the meals so that subjective reactions might not unconsciously influence the selection of the samples in the choice of which some measure of personal judgment was, however, inevitable. In the first hospital, X, the home sister co-operated in the work. Part of her duty was the serving of meals to the nurses, but she had no direct responsibility for their quality. In hospital Y a ward sister was selected and in hospital Z the sister tutor collected the samples. At none of the hospitals was any change made in the normal routine of meals during the weeks of survey.

The seven samples of the total day's food which were collected throughout the week were used for the analysis of calories, protein, fat, iron and calcium. Special arrangements were made for the collection of samples for the determination of vitamin C and of the pro-vitamin A, carotene. For the analysis of vitamin C samples were taken at each meal of potatoes, vegetables and other foodstuffs likely to contain the vitamin. The total weights of such servings were recorded and an aliquot then immediately put into an accurately weighed bottle containing a solution of metaphosphoric acid. The weighed bottles were provided daily from the laboratory and the samples in them kept in a cold store in the dark until the following day, when they were analysed. A similar procedure was followed for the estimation of carotene. In this case, however, servings of greens, carrots, etc., likely to contain vitamin A were placed in special bottles for separate analysis in the laboratory later.

It will be observed that the proximate composition of the diets has been determined, and the proportion of carotenoid-vitamin A and of vitamin C. No attempt was made to determine vitamin B_1. Since the introduction of national flour adequate amounts of vitamin B_1 have always been found to be present in diets of all descriptions. The amount of vitamin B_1 required is proportional to the caloric value, so that even if the amount of food provided is inadequate it is quite unlikely that a deficiency of vitamin B_1 will thus be caused. Although it might have been desirable to investigate the amount of other B-vitamins present in the hospital diets, analytical technique is hardly sufficiently far advanced for this to be done with any precision. The difficulties of analytical technique were also the reason that pre-formed vitamin A was not determined although, as will be seen later, an attempt has been made to estimate the amount present.

Particulars of the analytical methods used are given at the end of this section.

RESULTS

1. The Nutritive Value of Meals Provided for Patients.

The patients in hospital X received their breakfast at 6 a.m. Between 9.30 and 10 a.m. they were given a drink and received lunch at 11.45 a.m. At 3.30 p.m. they had tea, and supper of bread and butter (sometimes with cheese) was given them at 6 p.m. In hospitals Y and Z early morning tea was provided at 6 a.m., breakfast at 8 a.m., a drink at 10 or 11 a.m., and lunch at noon. In the afternoon tea was provided at 3 or 3.30 p.m., and supper—

again usually bread and butter, and perhaps cheese, at 6 or 6.30 p.m. At hospital Y only, a hot dish, such as soup, beans or milk pudding, was provided for supper. The nutritive value of these diets is shown in Table 1.

Table 1. *The nutritive value of the diets provided for patients at three hospitals of moderate size in the Greater London area.*

HOSPITAL X.

(*a*) *Male patients.*

Date	*Calories*	*Protein*	*Fat*	*Calcium*	*Iron*	*Vitamin A (Carotene only)*	*Vitamin C*
		g.	g.	mg.	mg.	i.u.	mg.
6.4.43 ...	1740	64	56	860	19	4600	7
7.4.43 ...	1530	48	54	880	10	0	0
8.4.43 ...	1720	60	56	890	12	700	7
9.4.43 ...	1390	66	35	810	10	0	7
10.4.43 ...	800	46	24	630	14	600	8
11.4.43 ...	1420	52	48	1230	13	0	2
12.4.43 ...	1340	46	40	700	6	3700	0
Daily average :	1420	55g.	45g.	850mg.	12mg.	1400i.u.	3mg.

(*b*) *Female patients.*

6.4.43 ...	1210	36	34	870	17	6100	6
7.4.43 ...	1450	44	62	750	16	0	3
8.4.43 ...	1210	47	45	660	10	300	1
9.4.43 ...	1230	50	35	750	8	0	0
10.4.43 ...	1070	40	38	580	14	700	7
11.4.43 ...	880	36	31	670	7	0	1
12.4.43 ...	1030	33	27	630	10	3600	0
Daily average :	1150	41g.	39g.	700mg.	12mg.	1500i.u.	3mg.

HOSPITAL Y.

Female patients.

27.4.43 ...	1810	61	53	1320	28	3300	1
28.4.43 ...	1760	60	37	750	91	700	11
29.4.43 ...	1640	56	41	950	31	0	11
30.4.43 ...	1460	37	32	830	12	600	0
1.5.43 ...	1920	76	64	1280	16	1200	7
2.5.43 ...	1690	63	53	880	12	0	7
3.5.43 ...	1630	53	49	1010	8	0	2
Daily average :	1700	58g.	47g.	1000mg.	28mg.	800i.u.	6mg.

HOSPITAL Z.

(*a*) *Male patients.*

Date	*Calories*	*Protein*	*Fat*	*Calcium*	*Iron*	*Vitamin A (Carotene only)*	*Vitamin C*
		g.	g.	mg.	mg.	i.u.	mg.
18.5.43 ...	1110	40	40	540	7	0	6
19.5.43 ...	1350	38	43	300	37	0	7
20.5.43 ...	1440	43	43	640	4	0	21
21.5.43 ...	1250	65	56	500	4	0	8
22.5.43 ...	1260	45	38	510	5	0	6
23.5.43 ...	1110	34	31	550	3	0	13
24.5.43 ...	1340	53	42	820	3	1200	28
Daily average :	1260	45g.	42g.	550mg.	9mg.	200i.u.	13mg.

(*b*) *Female patients.*

18.5.43 ...	980	34	33	570	6	0	5
19.5.43 ...	860	29	32	540	3	0	5
20.5.43 ...	1230	38	42	610	5	0	11
21.5.43 ...	780	35	32	450	5	0	6
22.5.43 ...	810	28	26	320	4	0	17
23.5.43 ...	890	42	28	460	2	0	7
24.5.43 ...	1190	46	38	610	4	100	17
Daily average :	960	36g.	33g.	510mg.	4mg.	15i.u.	10mg.

For patients lying in bed little more than the basal metabolic requirements of energy are expended. This energy output is proportional to the body surface. In the European literature such body surface for men is usually taken conventionally as 1.77 sq.m. based on 70 kilos (about 10 stone) body weight. On this basis the energy requirement for a man lying still is about 1,690 calories. It can be assumed, therefore, that the male patients in hospitals X and Z were not getting enough to eat unless the deficiency was made good by food provided by friends. The energy requirements of women patients, with their smaller body surface, are about 1,450 calories. Hence the food supplies in hospital Y were adequate, while hospitals X and Z provided insufficient to eat.

In the paragraph above the basal metabolism has been chosen arbitrarily as some indication of the energy output of a patient lying in bed. The fact, however, that patients in hospitals X and Z were not receiving even this amount of energy suggests that their diets were inadequate. Basal metabolism is strictly defined as the energy output of a subject who is at complete rest under

comfortable conditions and has had no food for the preceding twelve hours. When we come, therefore, to the consideration of patients in a hospital we must make an addition to provide allowance for the energy needed in the digestion of food, for making good wasted tissues and for the varying degrees of muscular activity expended by convalescing patients.

With regard to protein, since the needs of a man of 70 kilos body weight are at least 70 g. daily, whether he is lying in bed or not, the amounts of this nutrient provided for men appear to be inadequate at all the hospitals studied. If the average body weight of women is taken to be 54.5 kilos (Cathcart and Murray, M.R.C. Spec. Rep. Ser. No. 218. 1936) and the protein requirement at as many grams, sufficient protein is apparently available at hospital Y but not at hospitals X or Z.

The calcium and iron provided in the hospital diets at X and Y appear to be fully adequate for nutritional needs, but are inadequate at hospital Z. Iron in the diets of women patients at this last hospital is quite insufficient. The full daily requirements for adults are about 800 mg. of calcium and 12 mg. of iron.

When we turn to vitamin A and to vitamin C, none of the diets appear to reach the desirable levels. Of the vitamin A in the diets, only the carotenoid fraction derived from vegetable sources was determined analytically. To this might legitimately be added 1,000 i.u. daily as present in the pre-formed state in the full weekly rations of 2 ozs. of butter, 4 ozs. of margarine, 3 ozs. of cheese and 3 pints of milk. Although this 1,000 i.u. does not include any estimate of the vitamin A likely to be present in egg, it is considered to be a reasonable figure, since the additional amount of vitamin A which might be derived from egg is probably counter-balanced in most cases by the occasional times when the full weekly rations were not eaten by the subjects under investigation. In hospital X the daily intake of vitamin A from vegetable sources was 1,400 and 1,500 i.u. respectively for male and female patients. An addition of 1,000 i.u. daily from animal sources brings these values up to 2,400 and 2,500 i.u., or 48 per cent. and 50 per cent. of the desirable values. In the case of this hospital only, the estimate of 1,000 i.u. for animal vitamin A may be too low, since egg in some form or another was served for breakfast six times to the male and twice to the female patients during the week. In neither of the other hospitals Y or Z was egg provided for the patients during the week's investigation. In hospital Y, where female patients only were studied, the total estimate of the

daily intake of vitamin A was 1,800 i.u., or 36 per cent. of requirement, and in hospital Z, 1,200 i.u. and 1,000 i.u., representing only 24 per cent. and 20 per cent. of the desirable consumption, was all that was obtained from the hospital rations by the male and female patients respectively.

In the case of vitamin C, hospitals X and Y appeared to provide inadequate amounts. The Technical Commission of the League of Nations has suggested that 30 mg. of vitamin C daily is necessary for the maintenance of health. Many authorities have considered this figure to be too low, and the Ministry of Food, in harmony with the National Research Council of America, consider that 75 mg. of vitamin C are needed daily for full health. The minimum assessment of requirements for the *maintenance* of health by a well man, as distinct from the recovery of health by an invalid, is 30 mg. daily. The weekly average for the two hospitals was 3 and 6 mg. a day. At hospital Z the averages for meals for male and female patients were 13 and 10 mg. respectively.

2. The Nutritive Value of Meals Provided for the Nursing Staff

The arrangement of meals for the nursing staff in all the hospitals studied provided for a breakfast of porridge, sausage, bacon or egg, etc., at between 6.40 and 7.10 a.m. A snack of bread and butter or bread and cheese and a drink was provided at 9 or 10 a.m. at hospitals Y and Z but not at hospital X. Lunch was provided between 11.45 a.m. and 12.30 p.m., often in two sittings. Tea, of bread and butter, jam and usually bun or cake, was served between 4 and 5 p.m., and a hot supper between 7 and 7.45 p.m. The nutritive value of these diets is shown in Table 2.

Table 2. The nutritive value of the diets provided for the nursing staff at three hospitals of moderate size in Greater London area.

HOSPITAL X.

Date	*Calories*	*Protein*	*Fat*	*Calcium*	*Iron*	*Vitamin A (Carotene only)*	*Vitamin C*
		g.	g.	mg.	mg.	i.u.	mg.
6.4.43 ...	2510	65	99	830	76	6900	20
7.4.43 ...	1670	54	53	630	10	900	6
8.4.43 ...	1690	53	49	950	31	6300	3
9.4.43 ...	1940	87	63	470	23	0	2
10.4.43 ...	1820	69	70	830	20	1000	7
11.4.43 ...	1720	60	75	760	12	400	4
12.4.43 ...	1860	68	67	1330	13	7300	6
Daily average :	1890	65g.	68g.	830mg.	26mg.	3300i.u.	7mg.

Date	Calories	Protein	Fat	Calcium	Iron	Vitamin A (Carotene only)	Vitamin C
		g.	g.	mg.	mg.	i.u.	mg.
HOSPITAL Y.							
27.4.43 ...	2510	85	74	1470	17	5200	29
28.4.43 ...	2970	72	116	1490	32	1600	14
29.4.43 ...	2430	68	107	1150	26	400	39
30.4.43 ...	2600	83	105	1300	19	3700	36
1.5.43 ...	2320	84	84	1240	4	700	27
2.5.43 ...	2210	85	84	1130	17	200	21
3.5.43 ...	2130	75	67	1330	13	0	11
Daily average :	2450	79g.	91g.	1300mg.	18mg.	1700i.u.	25mg.
HOSPITAL Z.							
18.5.43 ...	2280	59	85	800	14	0	8
19.5.43 ...	2520	87	101	1220	10	0	9
20.5.43 ...	1830	77	75	1890	7	100	12
21.5.43 ...	2090	68	86	690	5	0	13
22.5.43 ...	2170	47	104	550	9	3100	60
23.5.43 ...	1900	67	67	580	5	700	32
24.5.43 ...	2270	80	63	500	12	700	34
Daily average :	2150	69g.	83g.	890mg.	9mg.	700i.u.	24mg.

The profession of nursing is a fairly strenuous one. It is usually accepted that the daily energy requirement of " moderately active women " is 2,500 calories. Orr and Leitch (Nutrition Abstracts and Reviews 7, 509, 1937-38) estimate that a housewife expends 2,100 calories daily. If, therefore, we assume that a nurse requires between 2,100 and 2,500 calories, it can be said that the nursing staff at hospital X do not get enough to eat. It was admitted at this hospital that when the opportunity occurred the nurses were accustomed to buy themselves buns and other food. This was stated not to be the case at hospital Y where, it can be seen, a more ample diet was provided.

It is generally assumed that the desirable protein consumption is 1 g. per kilo of body weight. Assuming a weight for nurses of 54.5 Kg., it appears that the dietary protein was adequate at all three hospitals.

Calcium and iron also appeared to be adequate in hospitals X and Y. The amount of calcium in the total diet is influenced to a great extent by milk and milk products and by the hardness or otherwise of the water. In London, where the hospitals were situated, the water contains from 23 to 26 parts of calcium

carbonate per 100,000, which is a moderately substantial proportion. In the case of iron, appreciable amounts may be derived from metal utensils. It is possible that daily fluctuations in iron intake may have been due to this cause. For example, on the day when 76 mg. of iron was found at hospital X, apple tart was served to the nurses. Apples are acid fruit which readily pick up iron from kitchen equipment.

If a daily additional estimate of 1,000 i.u. from animal sources is taken, as before, to be reasonable, the average total of vitamin A intake at the three hospitals appears to be 4,300, 2,700 and 1,700 i.u. respectively. It thus seems probable that at least two hospitals provided a diet for their nurses which was inadequate in vitamin A. While hospital X provided 86 per cent. of the desirable amount, and hospital Y provided 54 per cent., the diet of hospital Z apparently contained only 34 per cent. of the desirable value.

Whether the desirable level of vitamin C be taken at the optimum figure of 75 mg. or the protective value of 30 mg., the amount provided in the diet for nurses in hospital X is too little. In hospitals Y and Z, although three times the amount supplied by X is available, the level is still low.

From these results it appears that in none of the hospitals were fully adequate amounts of vitamins A and C provided ; in hospital X the nurses were not given enough to eat ; and in hospital Z iron in the diet was below the desirable level.

DISCUSSION

All the three institutions investigated were hospitals of the general type having normal bed complements of 150-250 beds. All dealt with those general medical and surgical cases which are the commonplace of hospital practice. Since the hospitals were in the Greater London area the average stay of patients in them is usually restricted to-day to a fortnight or less. Previously patients might have remained for two months or more.

Deficiency of calories is indicative of inadequacy in the amount of food available.

Protein is an essential food constituent. An early symptom of protein deficiency is anaemia, which is by no means an uncommon condition among hospital patients. It seems clear that the proportion of protein, particularly in the diet of male patients, ought to be increased. Shortage of iron, particularly for female patients, is undesirable.

Vitamin A may easily be a common defect in the diet in wartime. The diet of both patients and nursing staff could be improved by the serving of increased amounts of carrots and dark green leafy vegetables. At no time during the three weeks of the present survey was liver, the richest source of vitamin A, provided.

The amount of vitamin C in the diets of patients and nurses of all three hospitals was inadequate. In one hospital the cooking was partly to blame. In many cases the meals were left waiting on a hot-plate or trolley for some considerable time before they were served. At many meals at this hospital not only were no green vegetables served, but in addition, the potatoes were found on analysis to be entirely devoid of vitamin C. Although conditions were better at hospital Y, they could have been improved. For example, on five occasions it seemed clear that the same potatoes, reheated, were served to the nurses for supper as for lunch. At lunch time the contributions of helpings of these potatoes were 2, 10, 12, 8 and 5 mg. of vitamin C respectively, while at supper on the same days the contributions were 1, 0, 8, 0 and 0 mg. At hospital Z the choice of vegetables in the menu during the week of examination was limited. Patients, male and female, received potatoes as their only vegetable for six consecutive days ; this depressed their intake of both vitamin C and vitamin A. On the seventh day cabbage also was provided. The influence which well-cooked cabbage may exert, particularly at this spring time of the year, is vividly shown. On May 22nd the nursing staff were provided at lunch with $2\frac{1}{2}$ ozs. of good spring cabbage which provided, cooked, of itself 55 mg. of vitamin C and 3,300 i.u. of vitamin A !

It is recognised, of course, that wartime conditions place many formidable difficulties in the way of kitchen supervisors and their staffs. But even these difficulties should not prevent the provision of a wider range of vegetables in the meals than has been found.

If the three hospitals are compared, it can be said that hospital X provided the nurses with too few calories, too little vitamin A and too little vitamin C. The male patients at this hospital were also short of calories, protein, vitamin A and vitamin C. The female patients appeared to be in a similar state.

At hospital Y, the nurses were adequately fed with the exception of a shortage of vitamins A and C. The patients' diet also was adequate with respect to its proximate constituents, but short of vitamin A and almost devoid of vitamin C.

Hospital Z on the other hand provided more, though still insufficient vitamin C, but in this case its diet was radically lacking in vitamin A. Here, however, too few calories, insufficient protein and calcium were provided for all patients and inadequate iron for the women.

A shortage of calories which represents an indication of under-feeding could impair resistance. Protein is an essential food constituent. A deficiency of protein can retard the patients' recovery of health. Deficiency of iron, particularly for women, may aggravate anaemia. Shortage of vitamin A will tend to reduce resistance to infection and may in other ways affect adversely a patient already unwell from other causes. Deficiency of vitamin C is to be deprecated in post-operational patients with healing wounds.

ANALYTICAL METHODS

1. PROXIMATE ANALYSIS.

Clearly inedible parts such as bones from meat, larger bones from fish, fruit stones, etc., were removed and all the day's food thoroughly mixed together. A small sample, for which allowance was made, was removed for the determination of iron. The remainder was put through a mincer, heated on a steam-bath or steam-oven until practically dry and then reduced to a fine powder in a grinding mill. The resulting powder was very thoroughly mixed and weighed (M grams) :—

(*a*) Moisture : 5 g. of the air-dry powder was dried at 100° until constant weight was reached. Usually 3-4 hours was sufficient (W%).

(*b*) Ash : 5 g. was ignited at as low a temperature as possible (A%).

(*c*) Fat : 5 g. was extracted in a Soxhlet for about 5 hours with light petroleum, B.P. 40-60° (F%).

(*d*) Protein : Nitrogen was determined on 1 g. samples by the usual Kjeldahl method, using copper sulphate and anhydrous sodium sulphate to aid digestion. In the distillation 50 ml. O.I.N. sulphuric acid was usually employed and a blank determination carried out. Each ml. of O.I.N. H_2SO_4 neutralised was taken to be equivalent to 6.25 X N (P%).

(*e*) Carbohydrate : This was estimated by difference. Hence C%=100 –(W+A+F+P).

(*f*) Calories : The caloric value of the whole day's diet was given by the expression $(0.093 \times M \times F) + 0.041 \times M (100 - (M + A + F))$.

(*g*) Calcium : The ash (*b*) was heated with dilute HCl, the solution was neutralised with ammonia and sufficient acetic acid added to keep phosphates in solution. The hot solution was filtered and ammonium oxalate solution added. After an hour the solution was filtered through a weighed Gooch crucible, the precipitate washed and either dried at 100° C and weighed as calcium oxalate monohydrate or titrated with standardised potassium permanganate in the usual way.

(*h*) Iron : No iron mincers or grinders may be used in the preparation of samples for iron analysis. 2 g. samples were ashed at as low a temperature as possible. The ash was extracted with several small portions of concentrated HCl and each extract washed into a large test tube. The volume was diluted with water to 20 ml., 5 drops of concentrated HNO_3 added and the whole heated in boiling water for forty minutes. The solution was then washed into a separating funnel with a minimum of water, 5 ml. of 20 per cent. KSCN added and the iron extracted by shaking with successive 10 ml. portions of amyl alcohol. The extracts were collected in a dish, evaporated to dryness and gently ignited. The residue was dissolved in concentrated HCl and the volume made up to 100 ml. with water. Suitable aliquots, containing 0.02 to 0.05 mg. of iron were treated with a few drops of thioglycollic acid followed by excess NH_4OH and the iron determined colourimetrically in comparison with a standard solution prepared by dissolving 70 mg. of ferrous ammonium sulphate in a little water, adding 5 ml. O.I.N. H_2SO_4 and making the volume up to 1(l.). 1 ml. of this solution contains 0.01 mg. of iron.

2. Analysis of Vitamin C and Carotene.

(*a*) Vitamin C: 20 ml. of a freshly prepared solution of 2 g. glacial metaphosphoric acid dissolved in 100 ml. of 5% H_2SO_4 was measured into each of, say, twelve wide-mouthed 4 oz. bottles. The caps were replaced firmly and each bottle weighed to the nearest 0.1 g.

In the ward or the dining room where the meals were served, the helpings of potatoes, greens, etc., were weighed on a spring balance. Representative samples of about 20 g. of each item were then placed separately in the bottles containing the acid solution. The bottles were kept in the hospitals in a cold store in the dark until the analysis was completed. The length of time between collection and analysis rarely exceeded thirty hours.

Each bottle was reweighed in the laboratory and the exact weight of the sample was obtained. The material was then washed quantitatively into a mortar and ground to a fine pulp with the aid of a few grams of powdered quartz. The volume was then made up to 100 ml., mixed thoroughly and a part filtered. The filtrate was titrated into 1 ml. of a solution of 2.6 dichlorophenolindophenol standardised so that 5 ml. was equivalent to 0.1 mg. of ascorbic acid.

(*r*) Carotene: Carotene was determined by the Peterson Hughes modification of the Guilbert method (J.A.O.A.C., 22, 79, 1939) on the undried helpings of carrots, green vegetables, etc., collected for the purpose.

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Magnus Pyke,
Scientific Adviser's Division,
Ministry of Food.

24th June, 1943.

APPENDIX B

Account of the Setting Up of a Food Service Committee and the Appointment of a Dietitian as Food Supervisor at the General Infirmary at Leeds

The Committee have been much interested in the arrangements made at a voluntary hospital outside the London area (over 600 beds) to raise the standard of feeding. A short account follows.

Shortly before the war a dietitian was appointed for the special diets and for advisory work in Medical Out-patients. The hospital was fortunate in finding a dietitian with good qualifications, a knowledge of catering in the United States, administrative experience, and suitable personality. She gave most practical and sound advice on the lay-out and equipment of a new hospital kitchen. Her work was so successful that eventually she was appointed Food Supervisor, with responsibility for all the catering arrangements in the hospital, not merely the special diets. In addition to responsibility for the general ward diets, she was in charge of the nurses' dining rooms and of all the arrangements there. She was responsible for the appointment of staff, and the maids in the nurses' dining rooms as well as the kitchen were under her control. There was no trouble on the staffing side, and no friction with the cooks.

Purchasing was the joint responsibility of the Food Supervisor and the Steward. It was felt to be unwise to place complete authority in the hands of one person, such as the Steward, but on the other hand the Steward might have better practical ideas on purchasing than the Food Supervisor. The latter was consulted on any occasion when the quality of provisions sent was in question. If any difference of opinion arose, the matter was referred to the House Governor, or if important, to the Food Service Committee.

The Food Service Committee consisted of three physicians, one surgeon, five lay members of the Board (one of whom was Chairman), the House Governor and the Food Supervisor. Its agenda included such matters as suggested alterations in the menus of the patients and staff, comparative costs of food and the salaries of senior catering staff, not other appointments. The Committee had financial responsibility for expenditure on foodstuffs and wages, subject to approval by the Board.

The Food Supervisor effected many economies. The hospital was spending more on its catering, but was receiving very much better value and quality. The Food Supervisor received a salary of £300 a year resident.

The system was not yet completely worked out, inasmuch as the Food Supervisor's responsibility for the patients' meals other than the special diets ended when the food reached the wards. She had no direct contact with the patients, the serving of whose meals remained under the control of the ward sisters. It was hoped eventually, with the co-operation of the nursing staff, to arrange that the Food Supervisor should be in close touch with the patients, both to find out their wishes as to diet and also to educate them in good standards of feeding.

The hospital authorities feel that much has been achieved by gaining the interest of the medical staff and of the Food Service Committee, by ensuring expert advice on the dietary and supervision of all the processes involved, and by a right distribution of responsibility.

APPENDIX C

GROUP BUYING AT THE LONDON HOSPITAL

At present the voluntary hospitals for London purchase their requirements individually. This is neither economical nor efficient. Buying is carried out by Secretaries, Stewards, Matrons or Housekeeping Sisters, according to the size and the organisation of the hospital. A great many of these individuals have not the required experience nor the time to buy efficiently. The small hospital buys almost entirely in the retail market in very small quantities, and there are very few hospitals, if any, large enough to buy all their requirements wholesale at the lowest prices. At a great many hospitals the majority of the food is bought on contract for three or six months at a fixed price. Although this is necessary for such articles as milk and bread, in most other cases it is not economical ; with the fluctuation of prices it is quite impossible to foresee prices six months ahead and as the contractors fix the price they generally cover themselves for a rise, or if price goes down quality also goes down. Hospitals at present buy a great many articles of proprietary brands in small tins and packages which are unnecessarily expensive. The cost must be more when buying broken parcels or much advertised lines.

In 1930 the London Hospital reorganised its buying and catering department and centralised all buying of food for the London Hospital and its annexes, and later increased its buying by assisting other hospitals. In 1939 (in addition to the London Hospital) it was buying goods for the London Hospital Medical College and Hostel, six convalescent homes and four other small hospitals, amounting to nearly 10,000 meals a day. Owing to the large amounts bought it was possible to buy more cheaply, to have a trained staff to carry out the buying and checking of the food, a staff of storemen, a butcher and a fish man for preparation ; also a van for transport was purchased. This enabled the hospital to buy its meat, provisions, fish and vegetables in the respective markets at wholesale prices, its groceries (cereals, dried fruits, sugar, biscuits, jam, flour, tea and coffee) and the various proprietary articles, etc., direct from the manufacturer or producer.

Other advantages of the scheme are :—

The goods bought are of the most suitable quality. It is possible to buy in bulk and in large parcels (original packages, not small tins, jars, etc.) and to take advantage of articles in season and

those which are plentiful. All goods are carefully checked on arrival by experienced people and are sent to departments and other hospitals prepared, as far as possible, ready for cooking ; the fish is sent in portions ready filleted, the meat butchered, the bacon sliced and even, in some cases, the vegetables are sent prepared, the potatoes peeled and the bread and butter cut on the hospital's bread and butter machine.

The above organisation not only cuts the costs of the food at the London Hospital, owing to their being able to buy in larger quantities, but it shows a very considerable saving to the smaller institutions for whom it buys, while still allowing them a large measure of choice. It also saves a great deal of trouble and labour in the smaller hospitals and enables the catering to be improved. The London Hospital makes a charge of 5 per cent. for service and transport, which covers their cost. Price lists are issued weekly or monthly showing what is plentiful and what is scarce ; and advice is given on menus.

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